

REMARKS

Applicants respectfully request reconsideration and further examination of the present application.

I. Amendment to the Specification

The specification is being amended to include the noted Cross-Reference paragraph, in order to indicate that the present application claims priority from U.S. Provisional Application No. 60,/191,933. This paragraph was inadvertently omitted from the application at the time of filing. However, it is to be noted that this priority claim was clearly made on page 2 of Applicants' ADS, which was properly submitted at the time of filing.

II. Claim Status

Claims 1-10, 14-71 and 90-122 are currently pending.

Applicants acknowledge the withdrawal of the Election of Species requirement dated April 21, 2004. Accordingly, claims 1-6, 9, 10, 14-19, 21, 22, 40, 41, 47-49, 52, 54-58, 69-71, 90-95, 98-102, 106, 107, 113, 114, 116-119 and 122 are currently under examination. Claims 7, 8, 20, 23-39, 42-46, 50, 51, 53, 59-68, 96, 97, 103-105, 108-112, 120 and 121 have been withdrawn from consideration at this time for being directed to nonelected species.¹

With this Amendment B, it is to be noted that the designation for those claims that currently stand withdrawn has been changed to indicate this status, consistent with the Office's request on page 2, paragraph 1 of the present action.

Additionally, with this Amendment B, claims 1, 14, 15, 90, 91, 100, 101 and 107 have been amended as follows:

¹ It is noted that the Office included claim 103 with those claims currently under examination, rather than those claims that have been withdrawn. Upon review thereof, Applicants believe that this was unintentional, in as much as claim 103 is similar to claim 20, which also stands withdrawn at this time.

- Claims 1 and 90 have been amended, as further discussed below, to amplify that, as part of the presently claimed processes, a monomer is delivered to the metal-ligand compositions in the plurality of reaction vessels to form polymerization mixtures.
- Claim 1 has additionally been amended to more particularly claim a process wherein one or more metal-ligand compositions are formed without displacing any ligand from the soluble metal precursor, rather than simply a solublizing ligand. Support for this amendment may be found in the application, for example, on page 5, line 32 to page 6, line 3 (wherein it is indicated that, in one embodiment of the present process, no by-product results from the formation of a metal-ligand composition).
- Claim 90 has additionally been amended to more particularly claim a process wherein (i) one or more of the polymerization mixtures that are formed contain a displaced solublizing ligand resulting from the preparation of the metal-ligand compositions, and (ii) the displaced solublizing ligand in the polymerization mixture reduces the catalytic activity of the metal-ligand composition in the polymerization reaction of interest by less than about 80%. In addition to the claim as previously presented, support for these amendments may be found in the application, for example, on page 5, line 33 to page 6, line 30 and page 41, lines 23-27.
- Claim 91 has been amended to more particularly claim a process wherein the displaced solublizing ligand in the polymerization mixture reduces the catalytic activity of the metal-ligand composition in the polymerization reaction of interest by less than about 50%. Support for this amendment may be found in the application, for example, on page 5, line 33 to page 6, line 30.

- Claims 14, 15, 100 and 101 have been amended to amplify that a monomer is being delivered either before or after the activator.
- Finally, claim 107 has been amended to correct a typographical error therein.

III. Rejections under 35 U.S.C. §112, First Paragraph (New Matter)

Reconsideration is respectfully requested of the rejection of claims 1-6, 9, 10, 14-19, 21, 22, 40, 41, 47-49, 52, 54-58, 69-71, 90-95, 98-102, 106, 107, 113, 114, 116-119 and 122 under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement.

The Office asserts that the rejected claims contain subject matter which is not described in the specification in such a way as to reasonably convey to one of ordinary skill in the art that the inventors, at the time the present application was filed, had possession of the invention as claimed. In particular, the Office asserts that the limitation of "preparing an array of polymerization mixtures by delivering a polymerization monomer to the metal-ligand compositions in the plurality of reaction vessels of the integrated structure" has no clear support in the specification. The Applicants respectfully disagree.

As previously noted, claim 1, from which claims 2-6, 9, 10, 14-19, 21, 22, 40, 41, 47-49, 52, 54-58 and 69-71 depend, as well as claim 90, from which claims 92-95, 98-102, 106, 107, 113, 114, 116-119 and 122 depend, has been amended, in relevant part, to clarify the claim limitation at issue here. Specifically, this limitation has been amended to call for "delivering a polymerization monomer to the metal-ligand compositions in the plurality of reaction vessels of the integrated structure to prepare an array of polymerization mixtures therein." Applicants respectfully submit this claim limitation is supported by at least the following passages in the present application:

- page 38, lines 25-32 indicate that, once prepared, the metal-ligand compositions can be tested or screened for catalytic activity in one or more reactions of interest;

- page 41, lines 28-32 indicate that the metal-ligand compositions may be subject to a reaction of interest, such as a polymerization reaction;
- page 42, lines 3-27 indicate that screening for catalytic activity in polymerization reactions is of particular interest; and,
- finally, the Examples (see, e.g., page 45, line 16 to page 46, Table 1) generally detail the processes of claims 1 and 90 (see, e.g., Example 1, wherein a ligand array is prepared, a soluble metal precursor is added thereto, and then the array of metal-ligand compositions is exposed to ethylene, activated, and the heat of reaction monitored using infrared thermography).

In view of the foregoing, Applicants respectfully submit the process limitation of "delivering a polymerization monomer to the metal-ligand compositions in the plurality of reaction vessels of the integrated structure to prepare an array of polymerization mixtures therein" is supported by the present application. As such, this limitation is not new matter.

Accordingly, Applicants respectfully request reconsideration and withdrawal of the present rejection.

IV. Rejections under 35 U.S.C. §112, Second Paragraph

Reconsideration is respectfully requested of the rejection of claims 1-6, 9, 10, 14-19, 21, 22, 40, 41, 47-49, 52, 54-58, 69-71, 90-95, 98-102, 106, 107, 113, 114, 116-119 and 122 under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention.

A. *Preparing an Array of Polymerization Mixtures*

The Office asserts that the limitation of "preparing an array of polymerization mixtures by delivering a polymerization monomer to the metal-ligand compositions in the plurality of reaction vessels of the integrated structure" is unclear. In particular, the Office states that the correlation between making an array of polymerization mixtures and the claimed process of making and screening an array of metal-ligand compositions is unclear.

As noted above, claims 1 and 90 have been amended, in relevant part, to clarify this limitation, the claims calling for "delivering a polymerization monomer to the metal-ligand compositions in the plurality of reaction vessels of the integrated structure to prepare an array of polymerization mixtures therein." In view thereof, Applicants respectfully submit the present rejection is rendered moot, in as much as the language suggested by the Office has been used here.²

Applicants further submit, however, that the correlation between making an array of polymerization mixtures and the claimed process of making and screening an array of metal-ligand compositions is clear. As the present application illustrates, once prepared, the metal-ligand compositions can be screened in a reaction of interest, such as a polymerization reaction.³ This screening reaction may be carried out, for example, by adding a monomer to the metal-ligand compositions, thus forming polymerization mixtures.

In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the present rejection.

² It is noted that on page 9, lines 4-5 of the present action, the Office clearly suggests that the process limitation at issue here be amended to call for "delivering a polymerization monomer to the metal-ligand compositions to form a polymerization mixture."

³ See, e.g., the passages of the present application noted above, in response to the Office's 112, first paragraph (new matter) rejection.

B. *Subjecting the Array of Polymerization Mixtures to Conditions
Conducive to the Formation of Polymerization Reaction Products*

The Office further asserts that the limitation of "subjecting the array of polymerization mixtures in the integrated structure to conditions conducive to the formation of a polymerization reaction product, and screening said array for a polymerization reaction product" is also unclear. In particular, the Office states that the correlation between these steps and the claimed process of making and screening an array of metal-ligand compositions is unclear.

Applicants respectfully submit the present claims are not vague or indefinite, and that the correlation between the process steps at issue here, and the claimed process of making and screening an array of metal-ligand composition is clear. Specifically, it is to be noted that the claimed process is directed to making and screening an array of metal-ligand compositions. As the present application illustrates, once prepared, the metal-ligand compositions can be screened in a reaction of interest, such as a polymerization reaction.⁴ This screening reaction may be carried out, for example, by adding a monomer to the metal-ligand compositions, thus forming polymerization mixtures. Once prepared, the polymerization mixtures may then be subject to reaction conditions known in the art in an attempt to cause a polymerization reaction to occur, after which screening may be performed to detect and/or evaluate the polymerization reaction product.

In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the present rejection.

C. *Reactant*

As previously noted, claims 14, 15, 100 and 101 have been amended to reference a "monomer" rather than a "reactant." As such, Applicants respectfully submit the rejection of these claims, for being vague and indefinite due to the reference to "reactant" therein, is rendered moot.

⁴ *Id.*

In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the present rejection.

D. *Displaced Ligand*

As previously noted, claim 90 has been amended to clarify that the displaced ligand reference therein is the solublizing ligand. As such, Applicants respectfully submit the rejection of this claim, for being vague and indefinite due to the reference to "displaced ligand" therein, is rendered moot.

In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the present rejection.

V. **Rejection Under 35 U.S.C. §103**

Reconsideration is respectfully requested of the rejection claims 1-6, 9, 10, 14-19, 21, 22, 40, 41, 47-49, 52, 54-58, 90-95, 98-102, 106, 107, 113, 114, 116-119 and 122 under 35 U.S.C. §103 as being obvious in view of Weinberg et al. (U.S. Pat. No. 6,030,917) and Johnson et al. (J. Am. Chem. Soc., 1995). Reconsideration is further requested of the rejection of claims 70 and 71 as being obvious in view of Weinberg et al. and Johnson et al., and further in view of Murata et al. (U.S. Pat. No. 5,892,075).⁵

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the reference itself or in the knowledge generally available to one of ordinary skill in the art, to modify the reference. Second, there must be a reasonable expectation of success. And third, the prior art reference must teach or suggest all the claim limitations. MPEP §2142. With respect to the first of the three noted criteria, MPEP §2142 further states that, to support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention, or the Examiner must present a convincing line of reasoning as to why the artisan would have

⁵ In view of the Office's comment regarding 102(e) and the cited Weinberg et al. patent, the Office's attention is called to the PCT Patent Application No. WO 98/03521, which was cited in Applicants' IDS dated July 6, 2001. This is the PCT analog application of U.S. Pat. No. 6,030,917 and was published on January 29, 1998.

found the claimed invention to be obvious.

Applicants respectfully submit the Office has failed to establish a *prima facie* case of obviousness because, at a minimum, (i) the cited reference fails to teach or suggest all the claim limitations, and/or (ii) the Office has failed to provide a convincing line of reasoning to support that there is some suggestion or motivation, either in the reference itself or in the knowledge generally available to one of ordinary skill in the art, to modify the teachings of Weinberg et al. and Johnson et al., in order to obtain the process of claim 1 or claim 90.

A. *Claim 1*

Claim 1, from which claims 2-6, 9, 10, 14-19, 21, 22, 40, 41, 47-49, 52, 54-58, 70 and 71 depend, is directed to a process for preparing and screening an array of metal-ligand compositions. This process comprises:

preparing an array of metal-ligand compositions in a plurality of discrete reaction vessels contained by or within an integrated structure, wherein the plurality of reaction vessels of the array contain different metal-ligand compositions and said preparing comprises delivering a metal-binding ligand and a dissolved, soluble metal precursor to each of the plurality of reaction vessels of the array which combine to form the metal-ligand composition, wherein said soluble metal precursor comprises a solubilizing ligand and one or more of the metal-ligand compositions is formed without displacing a ligand from said soluble metal precursor;

delivering a polymerization monomer to the metal-ligand compositions in the plurality of reaction vessels of the integrated structure to prepare an array of polymerization mixtures therein;

subjecting the array of polymerization mixtures in the integrated structure to conditions conducive to the formation of a polymerization reaction product; and

screening said array for a polymerization reaction product.

Accordingly, it is to be noted that, in part, the process of claim 1 is directed to the preparation of an array of metal-ligand compositions using a dissolved, soluble metal precursor, wherein one or more of the metal ligand compositions are formed without displacing a ligand from said soluble metal precursor. As noted in the present application, the solution-based process of the present invention is advantageous for a number of reasons, including the fact that it enables a screening polymerization reaction to be carried out without the need for a purification step prior thereto (e.g., filtration or recrystallization, to remove for example a by-product, such as a displaced ligand, resulting from the preparation of the metal-ligand composition).⁶

Weinberg et al. fail to disclose a process wherein an array of metal-ligand compositions is (i) prepared by combining a metal-binding ligand and a dissolved, soluble metal precursor, wherein one or more of these compositions are formed without a ligand being displaced from the soluble metal precursor, and then (ii) subjected to a polymerization screening reaction. Rather, Weinberg et al. more generally disclose the preparation of an array of metal-ligand compounds,⁷ and then screening these compounds in, for example, polymerization reactions of interest.

Johnson et al. also fail to disclose the process of claim 1; that is, Johnson et al. fail to disclose a process wherein an array of metal-ligand compositions is (i) prepared by combining a metal-binding ligand and a dissolved, soluble metal precursor, wherein one or more of these compositions are formed without a ligand being displaced from the soluble metal precursor, and then (ii) subjected to a polymerization screening reaction. Rather, Johnson et al. disclose the preparation of catalysts, or metal-ligand

⁶ See, e.g., page 3, lines 6-26; page 5, line 32 to page 6, line 9; page 41, lines 23-27; page 45, lines 30-35; and, examples 1-35.

⁷ In this regard, and in response to the Office's statement related to Weinberg et al. on page 13 (first paragraph) of the present Office action, it is to be noted that, in some embodiments for example, metal-ligand compositions are prepared using metal precursors in solution with a ligand, where the ligand is displaced from the metal precursor (see, e.g., column 42, scheme 9 and related text).

compositions, which are soluble, and thus suitable for use as homogeneous catalysts in the polymerization reactions of ethylene and α -olefins.⁸ Accordingly, the word "soluble" in the first line of Johnson et al. is in reference to these catalysts, and not the precursors which are combined with ligands to obtain these metal-ligand compositions. Consistent with this view, it is to be noted that reaction Scheme 1 of Johnson et al. illustrates the activation of prepared, and purified, catalysts 3 and 4 with the activator $H^+(OEt)_2BAr'_4^-$, and catalyst 5 with the activator MAO. This activation of the prepared, and purified, catalysts is then followed by their reaction with olefin monomers.

Additionally, it is to be noted that, as part of the preparation process of Johnson et al., a ligand is displaced from the metal precursor used to prepare the catalyst. Furthermore, the prepared catalyst is isolated and purified, in order to remove, for example, the displaced ligand.

In view of the foregoing, Applicants respectfully submit the Office has failed to establish a *prima facie* case of obviousness, because the combination of Weinberg et al. with Johnson et al. fails to disclose or suggest all the claim limitations. Specifically, this combination simply does not disclose or suggest a process wherein an array of metal-ligand compositions is prepared by combining a metal-binding ligand and a dissolved, soluble metal precursor, wherein one or more of these compositions are formed without a ligand being displaced from the soluble metal precursor. Rather, both references disclose a process wherein a ligand is displaced from the metal precursor being used to prepare the catalyst, or metal-ligand composition.

Applicants additionally submit that the Office has failed to establish a *prima facie* case of obviousness because the Office has failed to provide a convincing line of reasoning to support that there is some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the teachings of Weinberg et al. and/or Johnson et al., in order to obtain the process of claim 1. Applicants respectfully submit there is simply no motivation for one of ordinary skill in the art to modify the processes disclosed in Weinberg et al. or Johnson et al., in order to obtain a process for preparing and screening an array of metal-ligand compositions in a polymerization reaction, wherein a

⁸ See page 6414, first sentence of Johnson et al., as well as pages 1-4 of the Supplementary Material.

ligand is not displaced from the metal precursor employed in preparing the metal-ligand composition. There is no such motivation because Weinberg et al. and Johnson et al. both disclose processes wherein a ligand is displaced, and then removed by a purification step prior to being used in a subsequent reaction. Accordingly, in this regard, both Weinberg et al. and Johnson et al. are focused upon the preparation of the end product, and in the case of Johnson et al. the solubility of that end product. Applicants therefore submit it is only through impermissible hindsight, in view of the present application, that one of ordinary skill in the art would be motivated to modify the processes of Weinberg et al. and Johnson et al. to obtain a process wherein a ligand is not displaced from the metal precursor, in order for example to avoid the need for a purification step prior to a screening reaction of interest.

Accordingly, Applicants respectfully submit claim 1 is patentable over the cited combination of references. In as much as claims 2-6, 9, 10, 14-19, 21, 22, 40, 41, 47-49, 52, and 54-58 depend from claim 1, these claims are submitted as patentable over the cited references for at least the same reasons as those set forth with respect to claim 1. Reconsideration of the present rejection is therefore respectfully requested.

With respect to claims 70 and 71, which also depend from claim 1, Applicants respectfully submit that Murata et al. do nothing to address the failures of the Weinberg et al. and Johnson et al. disclosures. Specifically, Murata et al. fail to disclose a process wherein an array of metal-ligand compositions is (i) prepared by combining a metal-binding ligand and a dissolved, soluble metal precursor, wherein one or more of these compositions are formed without a ligand being displaced from the soluble metal precursor, and then (ii) subjected to a polymerization screening reaction.

Accordingly, claims 70 and 71 are submitted as patentable over the cited references for at least the same reasons as those set forth with respect to claim 1. Reconsideration of the rejection of these claims is therefore also respectfully requested.

B. Claim 90

Claim 90, from which claims 91-95, 98-102, 106, 107, 113, 114, 116-119 and 122 depend, is also directed to a process for preparing and screening an array of metal-ligand compositions. The process comprises:

preparing an array of metal-ligand compositions in a plurality of discrete reaction vessels contained by or within an integrated structure, wherein the plurality of reaction vessels of the array contain different metal-ligand compositions and said preparing comprises delivering a metal-binding ligand and a dissolved, soluble metal precursor to each of the plurality of reaction vessels of the array which combine to form the metal-ligand composition, wherein said soluble metal precursor comprises a solublizing ligand and formation of one or more of the metal-ligand compositions is accompanied by the displacement of said solublizing ligand;

delivering a polymerization monomer to the metal-ligand compositions in the plurality of reaction vessels of the integrated structure to prepare an array of polymerization mixtures therein, wherein one or more of said polymerization mixtures contains a displaced solubilizing ligand resulting from the preparation of said metal-ligand compositions;

subjecting the array of polymerization mixtures in the integrated structure to conditions conducive to the formation of a polymerization reaction product; and

screening said array for a polymerization reaction product, wherein the displaced solublizing ligand reduces the catalytic activity of the metal-ligand composition in the polymerization mixture in the polymerization reaction by less than about 80%.

Accordingly, the process of claim 90 is directed to, in part, the preparation of an array of metal-ligand compositions using a soluble metal precursor that is dissolved, wherein as a result of that preparation a solublizing ligand is displaced therefrom, and further wherein this displaced solublizing ligand, which is present in the subsequently formed polymerization mixture, reduces the catalytic activity of the metal-ligand composition in the polymerization screening reaction by less than 80%.

As previously noted, the solution-based process of the present invention is advantageous for a number of reasons, including the fact that it enables a screening polymerization reaction to be carried out without the need for a purification step prior thereto (e.g., filtration or recrystallization). Accordingly, by-products, such as a displaced solublizing ligand, resulting from the preparation of the metal-ligand

compositions, may be present in the polymerization mixtures that are prepared.⁹ The present process is therefore advantageous in that, when present in the polymerization mixture, the displaced ligand is such that it reduces the catalytic activity of the metal-ligand composition in the polymerization reaction of interest by less than 80%.

Also as previously noted, both Weinberg et al. and Johnson et al. disclose processes wherein a ligand is displaced from the metal precursor employed in preparing the product catalyst, or metal-ligand composition. Notably, however, the resulting product (i.e., catalyst or metal-ligand composition) is purified prior to carrying out a subsequent reaction, such as a polymerization reaction.

Accordingly, both references fail to disclose or suggest a process wherein a displaced ligand is present in a subsequently formed reaction (e.g., polymerization) mixture. As such, both references also fail to disclose or suggest a process wherein a displaced ligand, present in a polymerization reaction mixture, reduces the catalytic activity in the polymerization screening reaction by less than 80%. It is therefore respectfully submitted that the Office has failed to establish a *prima facie* case of obviousness, because the combination of Weinberg et al. with Johnson et al. fails to teach or suggest all the claim limitations.

Applicants additionally submit that the Office has failed to establish a *prima facie* case of obviousness because the Office has failed to provide a convincing line of reasoning to support that there is some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the teachings of Weinberg et al. and/or Johnson et al., in order to obtain the process of claim 90. Applicants respectfully submit there is simply no motivation for one of ordinary skill in the art to modify the processes disclosed in Weinberg et al. or Johnson et al., in order to obtain a process for preparing and screening an array of metal-ligand compositions in a polymerization reaction, wherein a polymerization mixture formed therein contains a displaced solublizing ligand, and further wherein that displaced solublizing ligand reduces the catalytic activity of the metal-ligand composition in the polymerization reaction of interest by less than 80%. There is no such motivation because Weinberg et al. and Johnson et al. both disclose

⁹ See, e.g., page 41, lines 23-27.

processes wherein the resulting metal-ligand composition, or catalyst, is purified prior to a subsequent reaction. Accordingly, in this regard, both Weinberg et al. and Johnson et al. are focused upon the preparation of the end product, and in the case of Johnson et al. the solubility of that end product. Applicants therefore submit it is only through impermissible hindsight, in view of the present application, that one of ordinary skill in the art would be motivated to modify the processes of Weinberg et al. and Johnson et al. to obtain a process wherein a polymerization reaction mixture is formed in the presence of a displaced solubilizing ligand, and further wherein the displaced solubilizing ligand reduces the catalytic activity in the polymerization screening reaction by less than 80%.

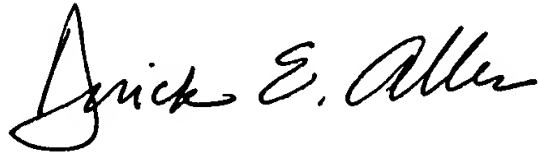
Accordingly, Applicants respectfully submit claim 90, as well as claims 91-95, 98-102, 106, 107, 113, 114, 116-119 and 122 depending therefrom, are patentable over the cited combination of references. Reconsideration of the rejection of these claims is therefore also respectfully requested.

CONCLUSION

In view of the foregoing, favorable reconsideration and allowance of all pending claims is respectfully requested.

* Applicants enclose herewith a check in the amount of \$910.00 (to cover a one (1) month extension of time for responding to the present Office action, as well as Applicants' Request for Continued Examination). The Commissioner is, however, hereby authorized to charge any underpayment or credit any overpayment to Deposit Account No. 19-1345.

Respectfully submitted,



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* Enclosure